A comparison of broad-scale model estimates with independent bird data from East-Africa

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Introduction

Biodiversity is globally declining and land use is one of the major causes
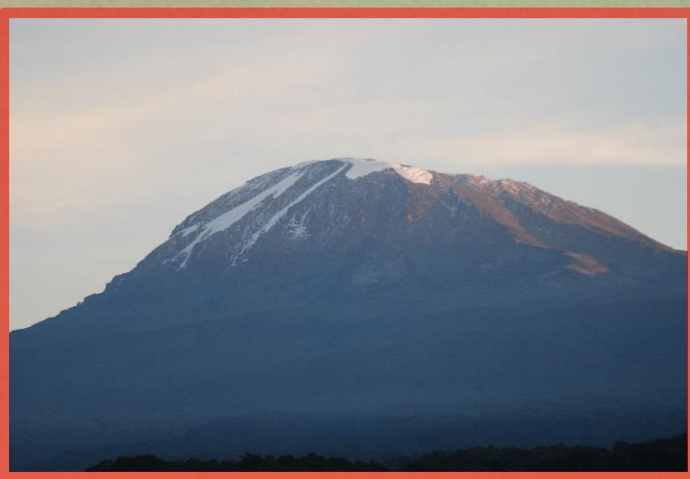
Global models of land-use impacts on biodiversity can help guide conservation decisions

However broad-scale models often have to generalize to be globally applicable

Question

Can local factors mediate responses of biodiversity to land use?
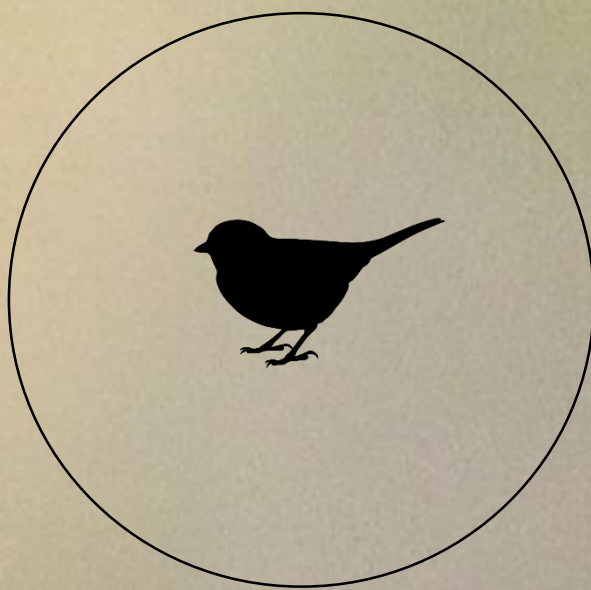
Scale:

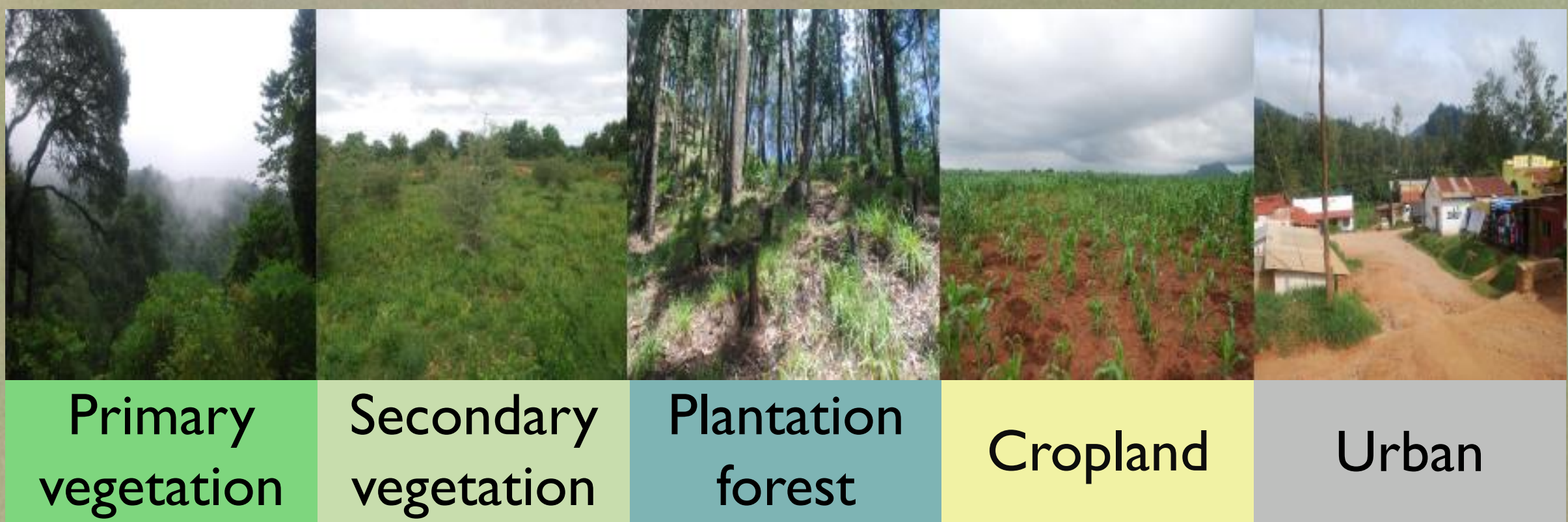Kilimanjaro (Tanzania) Taita Hills (Kenya) Africa-wide estimates

Species: VS

Land use classification:

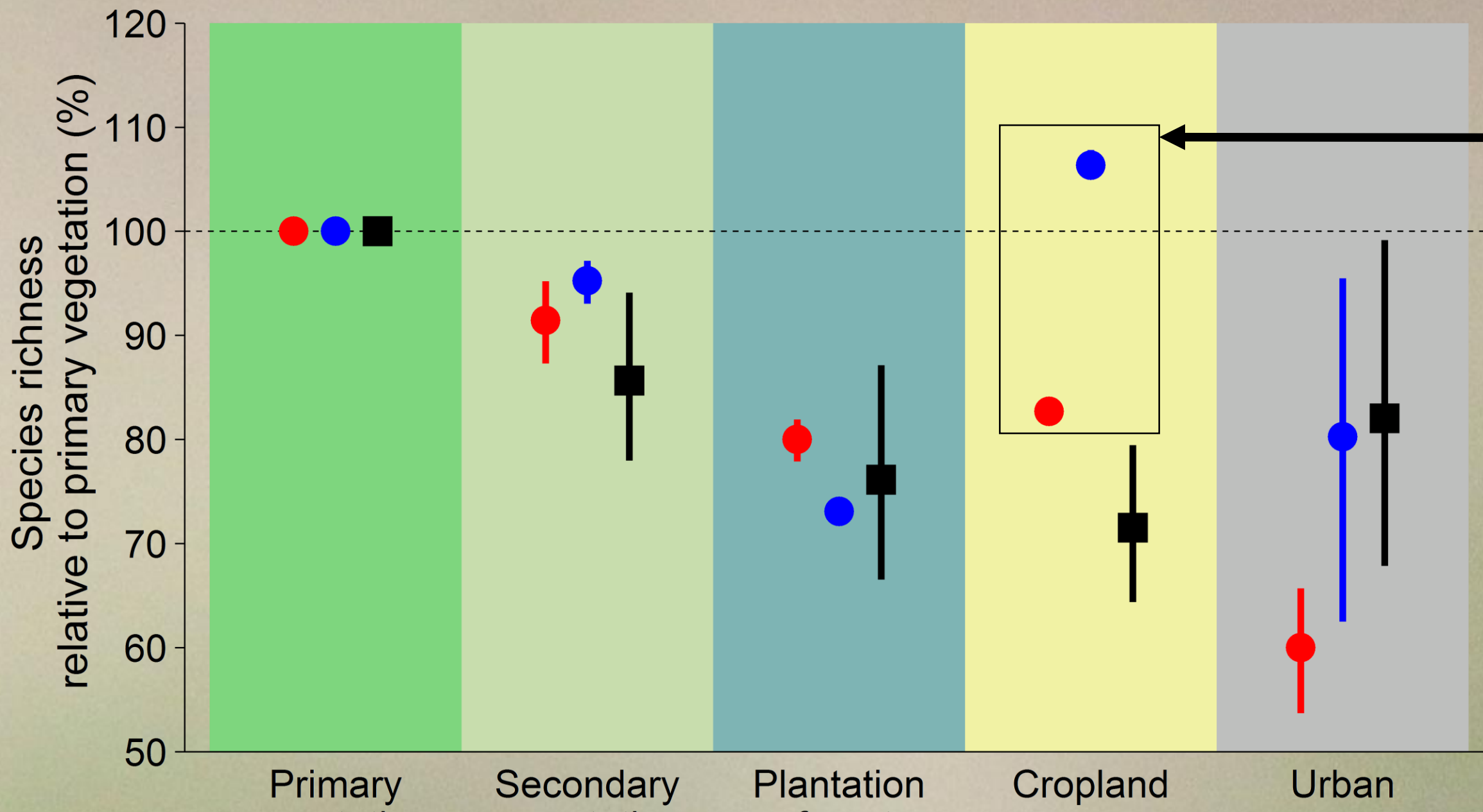Primary vegetation | Secondary vegetation | Plantation forest | Cropland | Urban

Species characteristics:
- Range-size
- Habitat specialism
- IUCN Threat status

Statistics: Generalized linear mixed models

Results

Species richness relative to primary vegetation (%)

Primary vegetation | Secondary vegetation | Plantation forest | Cropland | Urban

Kilimanjaro
Taita Hills
Africa-wide

Average model coefficients plotted against local estimates.
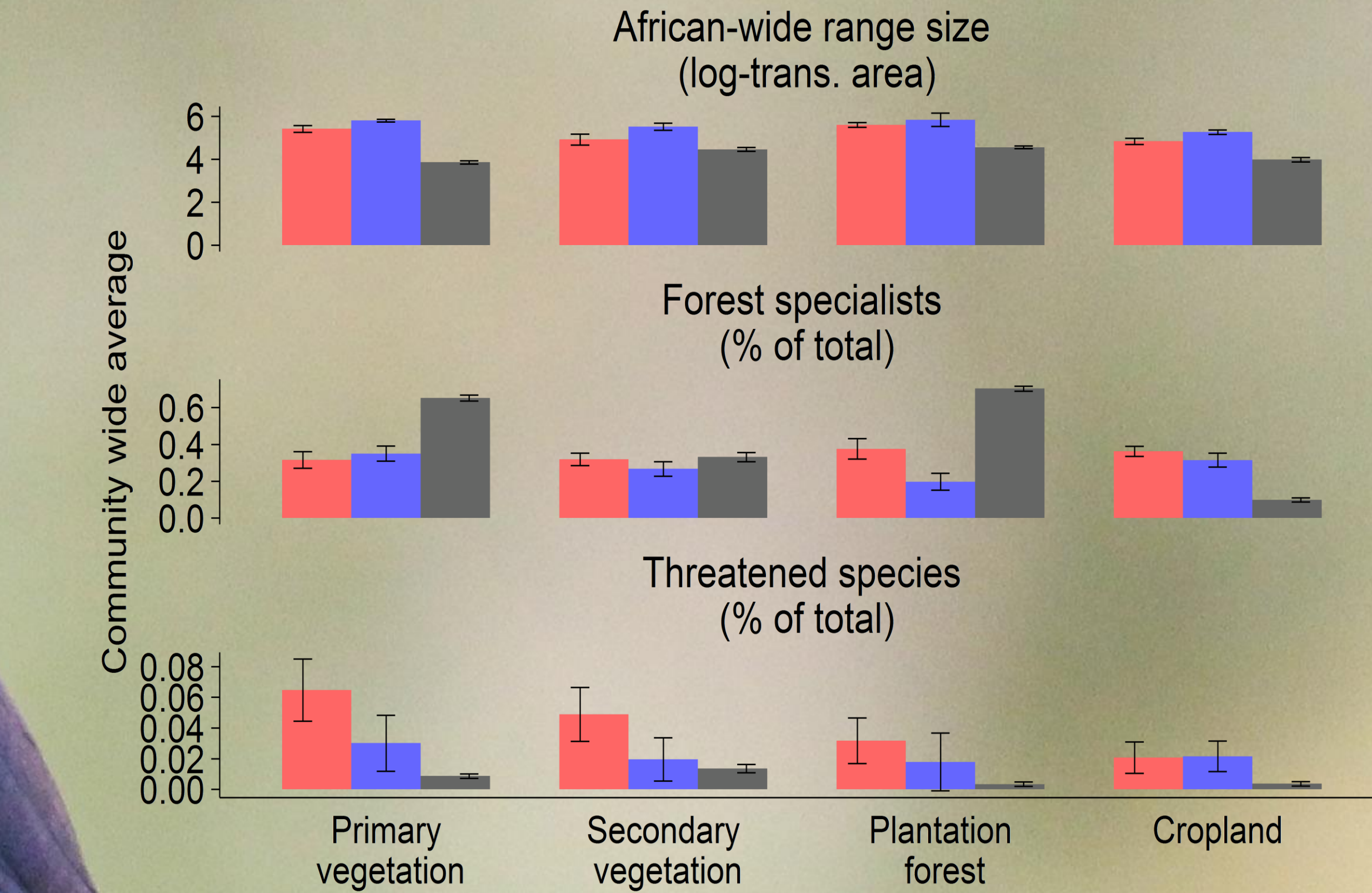
Cropland biodiversity higher than average across Africa

Likely caused by a special land-use form called agroforestry

(Combines properties of both agriculture and forestry)

African-wide range size (log-trans. area)

Forest specialists (% of total)

Threatened species (% of total)

Community wide average

Primary vegetation | Secondary vegetation | Plantation forest | Cropland

Average of bird assemblage characteristics in the local and Africa-wide dataset

Local sites had fewer forest specialists throughout except in croplands as well as more threatened species

Likely due to properties of local land-use systems and site history

Why do our results matter?

Our results show that local factors mediate species responses to land use

We recommend that surveys of local land-use systems be conducted before applying biodiversity models in a local context!

Greater blue-eared starling
Photo by Peter Steward

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